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THE IDENTITY OF SOME MARINE ANNELID WORMS IN THE UNITED STATES NATIONAL MUSEUM

By Olga Hartman

This paper embodies the results of some weeks of study of a portion of the annelid collection of the United States National Museum. I am indebted to the authorities of the Museum and to Dr. Waldo L. Schmitt, curator of the division of marine invertebrates, for making this material and the necessary facilities available to me. I am deeply grateful to the American Association of University Women for a financial grant that made it possible for me to undertake an examination of the types of many specimens of marine annelids of the New World in the United States and abroad.

The list of specimens reported on at this time comprises 50 species, alphabetically listed below and followed by the name herein accepted and the page where my discussion of it appears.

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Family POLYNOIDAE

Genus LEPIDASTHENIA Malmgren

LEPIDASTHENIA NATANS (Chamberlin)

Harmopsides natans CHAMBERLIN, 1919, p. 48 (U.S.N.M. No. 19718; off Peru).

There are numerous immature, more or less translucent specimens from Peru, Central America, and west toward Easter Island. The number of segments varies from 20 to 44. The largest (type) is in two pieces, an anterior end of 17 setigers and a posterior one of 27 setigers, representing perhaps an entire individual; if complete, ely-

trophores occur on segments 2, 4, 5, 7, 9 * * * 23, 26, 29, 32, 34, 37, 40, 43, a total of 19 pairs. All elytra except the last have been lost; they are tiny, nearly circular, translucent white, with entire margin.

The first segment is provided with long dorsal and ventral cirri; the former extend forward about as far as the long palpi; the ventrals are somewhat shorter. In addition to a stout, pointed aciculum, two (or 3 or 4) stout, blunt, yellow setae project from the parapodium. The second segment has a slender, tapering, notoacicular lobe but no setae; this is typical of more posterior parapodia. The neuropodium has a long, triangular, presetal lobe, from which the aciculum extends, and a very much shorter, postsetal lobe. Neuropodia on segments 4 to 14 have a unique modification consisting of an expanded, glandular area ventral to the triangular acicular lobe; it extends to the ventral face of the parapodium. This structure is large, conspicuous on segments 4 to 8 and gradually diminishes in size to the fourteenth segment. Dorsal cirri are long throughout, extending far beyond the parapodial lobes, but are shorter than the longest setae. Ventral cirri are slender, tapering, and inserted near the place where the ventralmost setae emerge.

Neurosetae are of two intergrading kinds, including (1) more numerous long, slender setae with many relatively coarse, widely spaced teeth on the outer side, tapering distally and ending in a fine, bifid tip, and (2) 7 or 8 shorter, coarser, inferior setae with a shorter serrated region, and ending in a coarser bifid tip. In these respects it agrees with *L. maculata* Potts (1910, p. 344) originally described from Zanzibar.

The monotypic genus, *Harmopsides* Chamberlin, was originally separated from *Lepidasthenia* because it was thought to have fewer elytra; since, however, the collection consists of only immature individuals, this character has no real significance. Monro (1937, p. 262) suggested that this might represent a juvenile stage of *L. maculata* Potts. In the latter, however, no mention has been made of glandular areas on segments 4 to 14, such as are present in *L. natans*. In other respects they agree rather well.

LEPIDASTHENIA ALBA (Treadwell)

Polynoë alba Treadwell, 1906, p. 1149 (U.S.N.M. No. 5201; Honolulu).
Polynoë lucida Treadwell, 1906, p. 1150 (U.S.N.M. No. 5202; off Hawaii).
Lepidasthenia alba Hartman, 1938a, p. 114.

I have again examined the types of *P. alba* and *P. lucida* and must conclude that they represent the same species. Earlier (1938a, p. 114) I referred them both to *Lepidasthenia* but separated them on the proportionate lengths of parapodia and the relative lengths

of their free parts. Both of these characters are perhaps the result of accidental fixation. Their resemblances to each other are far more striking. Both have the same well-rounded, nuchal lobe covering the posterior part of the prostomium; the first segment lacks projecting setae or acicula; in both setal structures and prostomial parts are identical. Both have beadlike rows of small papillations, disposed transversely across the dorsum of the first few segments, most numerous over the dorsal bases of the parapodia. Both have similar papillations across the ventrum between the base of the ventral cirri and the body wall. A similar condition has been described for *L. longicirrata* Berkeley (1923, p. 214). The notopodium is represented only by a short, papillar lobe. The ventral cirrus is inserted on the proximal half of the neuropodial base. Superior and inferior neurosetae resemble one another; the serrated region is short. Nephridial papillae are short and inconspicuous.

L. alba is known only from Hawaii.

Family SIGALIONIDAE

Genus LEANIRA Kinberg

LEANIRA ROBUSTA Verrill

FIGURE 8, *a*

Leanira robusta VERRILL, 1881, pl. 14, fig. 10 [fig. only]; 1885a, p. 426; 1885b, pl. 40, fig. 175 [fig. only] (U.S.N.M. No. 10320; off Newport, Rhode Island).

The prostomium is trapezoidal, about one and one-half times as wide as long. There are four eye spots, weakly visible, deeply embedded in the anterior half of the lobe. The median antennal base lacks ctenidia. Its appendage is short, less than the prostomial length. Paired prostomial antennae are about as large, inserted on the dorsal base of the first setiger. The first parapodium is directed forward, most of it lying ventral to the prostomium; it is both shorter and smaller than the second, which is also directed forward. The first setiger has a ventral cirrus less than half as large as the dorsal cirrus and two or three slender, cirriform fringes inserted between the dorsal cirrus and the dorsal paired prostomial antennae. The third segment is well developed, not at all fused with the preceding segment; it is plain dorsally, without either cirrus or elytrophore. Throughout, both branches of parapodia have conspicuous fringing papillae on both anterior and posterior faces.

Elytra are smooth, white, with entire margin, without fringe or papillae, but from the third with a lateral incision (fig. 8, *a*). The first pair is small, subcircular, leaving exposed the prostomial appendages and the first and second parapodial lobes; they overlap one another only slightly in the median line. From the twenty-seventh

segment elytra occur on all segments. Elytral cirri have ctenidia on their ventral face, but parapodia lack them.

Simple spinose setae are present from at least the twentieth segment to the end, but nowhere conspicuous. In more anterior segments their presence could not be verified because many of the setae have been broken off. Larger neurosetae are composite, with canaliculate, pointed appendage; the shaft is smooth and straight. All composite setae in a parapodium resemble one another except that ventrally they are much finer.

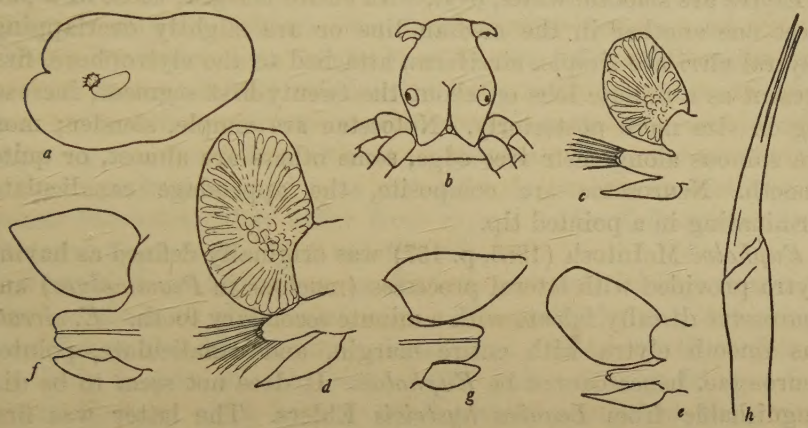

FIGURE 8.—Species of LEANIRA, ANAITIDES, EUMIDA, and PSAMMOLYCE (enlarged)

a, *Leanira robusta* (U.S.N.M. No. 10320): Elytrum from seventh segment; incised edge marks outer lateral margin.

b–e, *Anaitides catenula*: *b*, Anterior end in dorsal view; *c*, a far posterior parapodium; *d*, an anteromedian parapodium from widest region of body (U.S.N.M. No. 10153); *e*, a posterior parapodium (U.S.N.M. No. 481).

, *g*, *Eumida sanguinea* (U.S.N.M. No. 493): *f*, Outline of median parapodium; *g*, outline of posterior parapodium.

h, *Psammolyce flava* (U.S.N.M. No. 20032): A composite neuropodial seta.

The ventral surface of the body is smooth; ventral cirri are simple, cirriform. *L. robusta* is unique in having laterally incised elytra. It is known only from off Marthas Vineyard, Mass., in 100–126 fathoms.

LEANIRA HYSTRICIS Ehlers

Leanira hystricis EHLERS, 1875, p. 35; MCINTOSH, 1900, p. 434.

Eupholoë cirrata TREADWELL, 1934, p. 5 (U.S.N.M. No. 20033; north of Puerto Rico, in 260 fathoms.)

In the type of *Eupholoë cirrata* the prostomium is rounded, wider than long, without a median sulcus but with a depression where the median antenna is inserted. Its median antenna has a short base, without ctenidium. Eyes are lacking. The paired antennae are

inserted on the first segment, near the inner bases of the setal fascicles. Dorsal cirri are probably absent from all except the first segment. Parapodia are biramous, the fringing papillae especially long and numerous on notopodia throughout; they are present also on neuropodia but shorter and fewer. There are two small ctenidia on parapodia, one posterior to the insertion of the elytra, another at the posterodorsal face of the notopodium; they are largest on anterior segments and gradually get smaller and are not visible on posterior segments.

Elytra are smooth, white, oval, with entire margin; those of a pair meet one another in the median line or are slightly overlapping. Elytral cirri are simple, cirriform, attached to the elytrophore, first present as a minute lobe on about the twenty-first segment, increasing in size more posteriorly. Notosetae are simple, slender; most are spinous along their free edge, some others are almost, or quite, smooth. Neurosetae are composite, the appendage canaliculate, terminating in a pointed tip.

Eupholoë McIntosh (1885, p. 157) was originally defined as having elytra provided with lateral processes (much as in *Psammolyce*) and neurosetae distally falcate with a minute secondary tooth. *E. cirrata* has smooth elytra with entire margin, and canaliculate, pointed neurosetae, hence cannot be *Eupholoë*. It does not seem to be distinguishable from *Leanira hystricis* Ehlers. The latter was first described west off England and has since been reported in other parts of the Gulf Stream. It is a deep-water form.

LEANIRA GRUBEI (Treadwell)

Sthenelais grubei Treadwell, 1902, p. 187 (U.S.N.M. No. 15906; Mayaguez Harbor, Puerto Rico, in 12–18 fathoms).

The prostomium is trapezoidal, with four eyes, the anterior ventral pair slightly visible in dorsal view, the posterior pair elongate oval, on the anterior third of the lobe. The median antenna is inserted on a stout ceratophore with auricular paired ctenidia at its base; its cirrus extends distally about as far as the setae of the first segment. The paired antennae are inserted on the first setiger; they are clavate in shape, constricted subapically and terminating in an elongate knob; they are about one-third as long as the style of the median antenna. The first setiger has long, slender dorsal cirri and similar, though shorter (less than half as long), ventral cirri; its setae are fine, simple, numerous. The second and third segments are more or less fused on the dorsal side, as typical of *Leanira;* first elytra arise from the second segment. The third segment has neither elytra nor dorsal cirrus but a small branchial rudiment. Simple, spinulose setae are present from the third, numbering only three to five in a fascicle.

The first elytra are broadly ellipsoid in outline, imbricated medially; the margin is smooth except for a sparse fringe of short papillae. The second and third elytra are deeply excavate at their anterior edge and have a few short papillae at the outer margin. The fourth has a nearly straight, anterior margin and the lateral papillae a little longer. More posteriorly the elytra increase in size somewhat, are longer than wide, their anterior edge very slightly excavate, their outer lateral edge with a few slender fringes in a single row.

Notosetae are simple, delicately transversely serrated. Neuropodia have three or four superior, simple, spinose setae, more numerous, stouter, composite setae in the circumacicular fascicle, and similar, though slenderer, setae in the linear series. Composite setae have a shaft that is slightly thickened distally, with a few coarse spines but no transverse serrations; the appendage is long and slender, tapering to a fine point, without canaliculae. There are no falcigerous, composite setae, and none with bifid tip, such as characterize the genus *Sthenelais;* they differ from typical setae of *Leanira* only in that the appendage is not canaliculate.

Neuropodia of typical parapodia lack parapodial fringe except for two or three at the dorsal edge. Notopodia have a few longer papillae at the dorsoanterior distal edge. The ventral surface of the body is quite smooth; ventral cirri lack accessory fringe. Segments three to eight have a small clavate papilla on the ventral face of the parapodium, a short distance from its origin at the body wall. This species is referred to *Leanira* because the composite setae terminate distally in a point; falcigerous setae are lacking, and segments two and three are more or less fused dorsally.

Genus STHENELAIS Kinberg

STHENELAIS ARTICULATA Kinberg

Sthenelais articulata Kinberg, 1855, p. 387; 1910, p. 28.
Sthenelais tertiaglabra Moore, 1910, p. 395 (U.S.N.M. No. 17108; southern California).
Sthenelais hancocki Hartman, 1939, p. 65.

The first parapodium is about as long as the second but somewhat stouter and directed straight forward. Its base is proportionately long. In addition to a long dorsal cirrus and a shorter ventral cirrus, it has paired prostomial antennae, inserted near the inner dorsal base of the superiormost setae, about two-thirds as long as the ventral cirrus, terminating in a small, elongate knob. Segments three to five have a small, clavate, accessory, ventral cirrus, inserted about midway between the main ventral cirrus and the body wall. The ventral surface is smooth. Parapodial lobes practically lack fringing papillae except in the first few segments, where they are

present at the distal ends of both podal lobes but not conspicuous. Simple spinose setae are present from the third setiger, numbering three to five in a parapodium, but nowhere conspicuous. The appendage of heavier neuropodial setae tapers distally and terminates in a very fine, though distinctly bifid, tip, canaliculate along its length. There are one or two coarser setae with simple appendage, the tip bifid, the accessory tooth long, sheathlike. Elytra are translucent, with fringe on the outer margin, in a single row. Elytral spines are triangular, conical.

The identity of *S. articulata* Kinberg, from Rio de Janeiro, with *S. tertiaglabra* and *S. hancocki* (both from southern California) was not suspected until the type of the first was reexamined. This was made possible through the courtesy of Prof. Sixten Bock, of the Swedish State Museum. The characteristic neuropodial setae and conical elytral spines are unique features of this species.

Genus PSAMMOLYCE Kinberg

PSAMMOLYCE FLAVA Kinberg

FIGURE 8, *h*

Psammolyce flava KINBERG, 1855, p. 388; 1910, p. 31.
Eupholoë acuminata TREADWELL, 1934, p. 3 (U.S.N.M. No. 20032; off Puerto Rico).

The prostomium has a stout median antenna and four minute eye spots embedded in the anterior frontal portion of the lobe. The paired ventral eyes are larger but can be seen only by pushing aside the median antennal base. Paired antennae are tiny, inconspicuous, and inserted near the inner bases of the first setiger. The median antenna is long and slender and extends distally as far as the setae of the first segment but is surpassed by the long, smooth palpi.

Parapodia are biramous, with conspicuous, flangelike ctenidia on the dorsal face of notopodia. The third segment has a slender, short cirrophore and a short elytral cirrus immediately ventral to it. A style is no more present. Elytral cirri are present from the second segment, on the outer base of the elytrophore.

Elytra are subovate, without lateral processes, but with fringe on all except the anterior margin; most of the dorsal surface is encrusted with fine white sand or shell particles, except where overlain by the preceding elytrum. Notosetae are slender, in full spreading fascicles, delicately spinous. Neurosetae are much coarser, fewer; all resemble one another except that the ventralmost are smaller and finer. They have an oblique, articulating surface; the appendage terminates in a tapering tip in which the distal end is bifurcated for a distance nearly half the length of the appendage (fig. 8, *h*). This condition is seemingly natural, not a result of breakage, since it has been observed on all neurosetae that were carefully examined. The shaft is nearly

smooth. In far anterior segments the neurosetae have a longer appendage, the shaft is similar or somewhat roughened.

The middorsal portions of the body segments, between the dorsal parapodial bases, have three stalked, clavate papillae in a transverse row, to which foreign particles adhere.

Another specimen labeled "*Eupholoe acuminata*" comes from latitude 18°30′30″ N., longitude 66°23′5″ W., in only 40 fathoms. This is also a *Psammolyce* but differs from the preceding and is believed to represent perhaps an undescribed form. Its elytra have conspicuous inner processes, consisting typically of a larger, subcircular lobe at the inner, anterior edge, and three much smaller, elongate lobes along the posterior margin of the elytrum. The four prostomial eyes are dark and conspicuous, the ventral pair being at the sides of the prostomium, readily seen in lateral and frontal views; the dorsal pair are at the sides of the median antennal base. The median antennal style is long and slender but surpassed in length by the setae of the first segment. Paired antennae are inserted on the first setiger, the style about one-third as long as that of the median style. Neurosetae are stout, the shaft transversely serrated, the appendage thick, falcate, the tip entire, blunt, slightly recurved. The same species is represented in the National collections by another specimen labeled "*Ps. ridiga.* No. 15954. *Fish Hawk* Sta. 6062. Mayaguez Harbor, in 25–30 fms."

Eupholoë acuminata must be referred to *P. flava* Kinberg with which it agrees fully.

Family PHYLLODOCIDAE

Genus ANAITIDES Czerniawsky

ANAITIDES CATENULA (Verrill)

FIGURE 8, *b–e*

Phyllodoce catenula VERRILL, 1873, p. 587 (U.S.N.M. No. 10153; Vineyard Sound, Mass.); 1874, p. 39.
Phyllodoce arenae WEBSTER, 1879, p. 105 (U.S.N.M. No. 481; New Jersey).

There is a single specimen, labeled *Phyllodoce catenula*, with proboscis withdrawn; it is so coiled and twisted that its length is not easily determinable. The proportions are about as stated by Verrill (75 mm. long, 1.5 mm. wide); hence this is a moderately long, slender species. The prostomial lobe is longer than broad, widest near its middle (fig. 8, *b*) just anterior to the two large, dark eyes; the posterior margin is cleft, with a nuchal papilla that is somewhat concealed by the overhanging lobes. The first segment is dorsally reduced, the second and third segments are free from one another.

Tentacular cirri are long, slender, tapering; the longest reaches back to the eighth or ninth segment.

Dorsal cirri are broad, foliaceous, somewhat imbricated; ventral cirri are elongate, prolonged in a slender tip (fig. 8, *c*, *d*). The setal lobe is long and distally incised and does not extend laterally so far as the ventral cirri. Setae have shafts that terminate in a finely spinose end, without a major tooth; the appendage tapers and is slender and rather short.

This has been compared with the type specimens (2) of *Phyllodoce arenae* Webster. They agree closely in all details except one. Prostomial proportions are identical, the setal lobe is prolonged laterally, ventral cirri are long, pointed, extending distally beyond the setal lobe (fig. 8, *e*). Dorsal cirri have the same shape and texture, but in Webster's specimens there is a longitudinal ridge (not now so pronounced as was originally shown) near the upper margin of the dorsal cirrus, and the glandular striations are less conspicuous. In both, the proboscis was originally described with longitudinal series of conical papillae, hence belong to *Anaitides*.

A. catenula (believed to include *P. arenae*) is characterized as follows: (1) The prostomium is incised at its posterior margin, provided with a nuchal papilla, (2) ventral cirri are long, taper to slender points, extend laterally beyond the setal lobe, (3) dorsal cirri are foliaceous, longer than broad, distally subtruncate, and (4) the proboscis has 12 rows of papillae on the basal portion.

Genus PHYLLODOCE Savigny

PHYLLODOCE MAGNAOCULATA Treadwell

FIGURE 9, *c*, *d*

Phyllodoce magnaoculata TREADWELL, 1902, p. 191 (U.S.N.M. No. 15951; Puerto Rico).

In the unique type the eyes are now completely faded; the proboscis is not everted. There is no indication of a nuchal papilla; the posterior border of the prostomium is straight, hence not as Augener (1934, p. 127) has described for *Anaitides benedeni* (Hansen). The peristomial cirri are thick, clavate, subequal in length, two or three times as long as the prostomium. Dorsal cirri are broadly rounded, much wider than long, with a dark spot near the outer ectal margin (fig. 9, *c*, *d*). Setae number about 18 in a fascicle in posterior fourth of the body. They have a slender, sickle-like appendage; the shaft is distally somewhat thickened but appears quite smooth. Ventral cirri resemble the dorsal cirri but are smaller (fig. 9, *d*).

This was incorrectly referred to *Anaitides benedeni* (Hansen) (Augener, 1934, p. 128). The latter was said to have a "herzformige

hinten ausgerandete Kopf," hence not as in *P. magnaoculata;* also the dorsal and ventral cirri are otherwise.

PHYLLODOCE FRAGILIS Webster

Phyllodoce fragilis WEBSTER, 1879, p. 214 (U.S.N.M. No. 535; Virginia).—ANDREWS, 1891, p. 281.

The type vial contains about seven specimens. The body is elongate and tapers gradually toward both ends to filamentous proportions; thus, the structures of the head and proboscis are extremely difficult

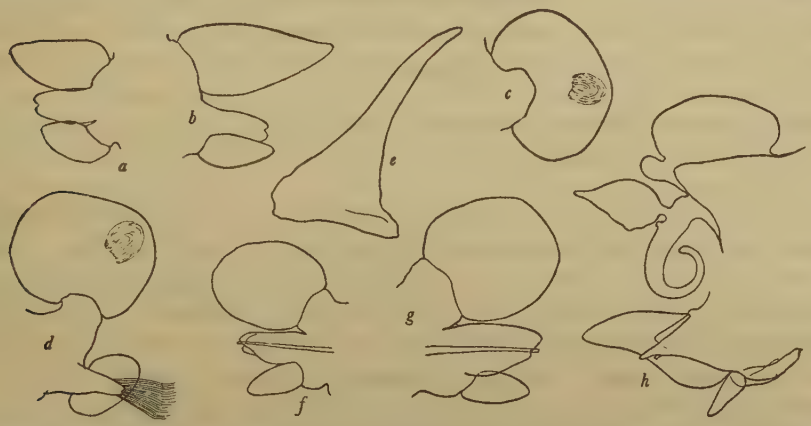

FIGURE 9.—Species of EULALIA, PHYLLODOCE, GLYCERA, ETEONE, and NEPHTYS (enlarged)

a, b, Eulalia viridis (U.S.N.M. No. 10159): *a,* Outline of eighth parapodium; *b,* outline of a posterior parapodium.

c, d, Phyllodoce magnaoculata (U.S.N.M. No. 15951): *c,* Dorsal cirrus from a median segment; *d,* parapodium from posterior fourth of body.

e, Glycera mexicana (U.S.N.M. No. 19372): Aileron from jaw piece.

f, g, Eteone trilineata (U.S.N.M. No. 441): *f,* Outline of a posterior parapodium; *g,* outline of a median parapodium.

h, Nephtys macroura (U.S.N.M. No. 15882): Outline of a median parapodium, the two rami separated from one another.

to distinguish. The prostomium is small, suboval, with straight posterior margin, without nuchal or median papilla. The two eyes are large and dark. The first segment is dorsally reduced and has a pair of clavate cirri; the second segment is a complete ring, with dorsal and ventral cirri resembling those of the first, but a little larger. The third segment has clavate cirri dorsally and short, flat ventral cirri. The formula of the first three segments follows: (lc=long cirrus, sc=short cirrus, S=setae): $lc+S\frac{lc}{lc}+S\frac{lc}{sc}$. From the fourth segment dorsal cirri are broad, thin, foliaceous, about twice

as long as wide, and distally rounded, though asymmetrical. They increase rapidly in width posteriorly and are broadly imbricated.

This species was collected many times by the author in oyster clusters at Beaufort, N. C. In life it is bright green; it is gregarious, with a tendency to mass together in interstices of oyster clumps. In spite of numerous attempts to incite the protrusion of the proboscis in life, no success was obtained. Examinations of dissections revealed only a slender, wrinkled tube.

Genus EUMIDA Malmgren

EUMIDA SANGUINEA (Ørsted)

FIGURE 8, *f*, *g*

Eulalia sanguinea ØRSTED, 1843, p. 28, figs. 80, 82.
Eulalia maculosa WEBSTER, 1879, p. 215 (U. S. N. M. No. 493; Great Egg Harbor, N. J.).

In the type of *Eulalia maculosa* the proboscis is smooth; hence this is a *Eumida*. It terminates distally in 17 soft papillae. The median prostomial antenna is inserted a short distance anterior to the large, dark, paired eyes. The longest tentacular cirri extend posteriorly to about the tenth setiger. Dorsal cirri are thin, foliaceous, longer than broad, but increase in length posteriorly; these parts are shown in figure 8, *f*, *g*, for median and posterior parapodia.

This agrees well with the widely known *E. sanguinea*, already reported from many parts of the north Atlantic and Pacific.

Genus EULALIA Savigny

EULALIA VIRIDIS (O. F. Müller)

FIGURE 9, *a*, *b*

Nereis viridis MÜLLER, 1776, p. 156.
Eumidia vivida VERRILL, 1873, p. 584 (U.S.N.M. No. 10159; Vineyard Sound, Mass.).
Eulalia viridis FAUVEL, 1923, p. 160.

The type collection of *Eumidia vivida* includes about 12 specimens. The everted proboscis is cylindrical, covered over its entire length with irregularly dispersed papillae or forming seven or eight irregular, longitudinal rows. The first tentacular segment is dorsally entire, as typical of the genus *Eulalia*. The median prostomial antenna is inserted a short distance anterior to the eyes. Dorsal and ventral cirri and parapodial lobes have the proportions shown in figure 9, *a*, *b*. These are typical representatives of *Eulalia viridis* (O. F. Müller).

Genus ETEONE Savigny

ETEONE TRILINEATA Webster and Benedict

FIGURE 9, *f*, *g*

Eteone trilineata WEBSTER and BENEDICT, 1887, p. 712 (U.S.N.M. No. 441; Eastport, Maine).

The prostomium is trapezoidal in outline, with a broad, shallow, median sulcus throughout its length. Dorsal cirri are thick, broadly rounded, as broad as long in median segments (fig. 9, *g*), somewhat longer than broad in posterior segments (fig. 9, *f*). Ventral cirri are longer than wide but never extend distally beyond the setigerous lobe; the superior acicular lobe exceeds in length the inferior acicular one. The two anal cirri are long, thick, about as originally shown. The setal shaft has a long tooth on one side and a shorter on the other. The specific name refers to three longitudinal color bands dorsally, consisting of a narrow median and a pair of broad, lateral ones.

E. trilineata inhabits sandy mud or shelly bottoms, in the low intertidal zones or somewhat below.

Family NEPHTYIDAE

Genus NEPHTYS Cuvier

NEPHTYS MACROURA Schmarda

FIGURE 9, *h*

Nephthys macroura SCHMARDA, 1861, p. 91.
Nephthys circinata VERRILL, 1874, p. 38 (U.S.N.M. No. 15882; St. Georges Bank, Maine, in 85 fathoms).

The recurved cirri are involute, present from the third setiger, continued nearly to the posterior end; the last five or six segments lack them. The postacicular setae are long, silky, flowing, with few or no denticulations; preacicular setae are finer, barred. No lyre setae have been observed. A typical parapodium is shown in figure 9, *h*.

The resemblance between this and *N. macroura* Schmarda (1861, p. 91) is sufficiently striking to suggest identity. Both have involute cirri, and the lobes on notopodia and neuropodia are the same except that *N. circinata* has a more pronounced supraacicular neuropodial lobe. *N. macroura* was originally described from New Zealand, but since it has been widely reported from southern and eastern South America as *N. praetiosa* Kinberg (1865, p. 239), from La Plata as *N. virginis* Kinberg (1866, p. 239), from southeastern South America, and as *N. lutrea* Baird (1873, p. 95) from Patagonia. A subspecies, *peruana* Hartman (1940, p. 236), has been described

from Peru in 10–40 fathoms. *N. circinata* is herein referred to *N. macroura;* it represents the first record of its distribution north of the equator.

Other collections deposited in the Museum originate from "Massachusetts Bay, Sept. 21, 1878. Sta. 221. 37–38 fms." and "Bay of Fundy, 1872. 6022."

Family LUMBRINERIDAE

Genus LUMBRINERIS Blainville

LUMBRINERIS ACUTA (Verrill)

FIGURE 10, *a–d*

Lumbriconereis acuta VERRILL, 1875, p. 39; 1882, p. 314 (U.S.N.M. No. 13392; off Block Island, R. I.).

This is a slender, greatly attenuate form, about 30–40 mm. long. The most conspicuous feature is the greatly elongated, slightly depressed, prostomial lobe (fig. 10, *a*); eyes are lacking. The peristomial ring is faintly biannulate. Segments are well marked, smooth, uniannulate; they are about as long as wide, or only half that long. The maxillary apparatus has carriers that are proportionately enormous and approximately triangular in outline. Forceps are robust, with two blunt teeth; maxilla II has three blunt teeth; maxilla III has a single tooth; maxilla IV has one tooth (fig. 10, *c*). Mandibles are about as long as the maxillary apparatus; the bases are slender, the anterior end flaring.

Parapodia are short, inconspicuous in the anterior region, with short simple lobes; posteriorly the postsetal lobe elongates slightly but is nowhere markedly developed. Setae are simple only; in anterior segments the bilimbate setae have wings that are rather broad (fig. 10, *b*). Hooded hooks are present in median segments, accompanied with some limbate setae; these have a short, hooded area with obscure denticulations distally (fig. 10, *d*).

In its peculiarly elongated prostomium *L. acuta* greatly resembles *L. mucronata* Ehlers (1912, pl. 12, fig. 10) from the mouth of the Congo River. In this, however, the distal ends of the hooded hooks are markedly bidentate; also, the maxillary apparatus is otherwise.

L. acuta is known only from New England.

LUMBRINERIS GRANDIS (Treadwell)

FIGURE 10, *h, k, l*

Lumbriconereis grandis TREADWELL, 1906, p. 1170 (U.S.N.M. No. 5214; Hawaii).

There is a single specimen in three pieces, lacking a posterior end. The prostomial lobe is thick, conical, about as long as wide. Many of the anterior setae are broken away, but a seventh parapodium

has composite setae with a long, slender appendage (fig. 10, *l*). Composite setae are continued through at least 26 segments in the last of which there are at least three limbate setae, two composite hooks, and three simple hooded hooks. The appendage of the composite hooks decreases in length posteriorly so that its length comes to be only about three times its width. More posteriorly (after the twenty-sixth segment) composite setae are gradually more or less completely replaced by simple hooks. Limbate setae may be absent after the sixtieth segment; none were observed after that.

FIGURE 10.—Species of LUMBRINERIS (enlarged)

a–d, *Lumbrineris acuta* (U.S.N.M. No. 12882): *a*, Anterior end from left side; *b*, bilimbate seta from third parapodium; *c*, maxillary parts; *d*, hooded hook from a median-posterior parapodium.

e–g, *Lumbrineris heteropoda* (Honshu, Japan): *e*, Tenth parapodium; *f*, a median parapodium; *g*, a posterior parapodium.

h, *k*, *l*, *Lumbrineris grandis* (U.S.N.M. No. 5214): *h*, Maxillary parts from one side; *k*, outline of an anterior parapodium; *l*, composite seta seventh parapodium.

i, *j*, *m*, *Lumbrineris parva-pedata*: *i*, Outline of an anterior parapodium (U.S.N.M. No. 16019); *j*, fifth parapodium in anterior view (U.S.N.M. No. 19622); *m*, hooded hook from a median segment (U.S.N.M. No. 16019).

In this specimen the third maxillary plate on both right and left sides is clearly bifid (fig. 10, *h*); the forceps are distinctly falcate. Parapodia are short, thick throughout; the postsetal lobe exceeds the presetal one. The latter are simply low, rounded, cushionlike or compressed; postsetal lobes are more or less acutely pointed, their length, however, no greater than their width (fig. 10, *k*).

L. grandis has affinities with *L. japonica* Marenzeller in having composite setae in anterior segments, and maxillary parts are similar. In *L. grandis*, however, the parapodial lobes are much reduced

throughout. It differs also from *L. minuscula*, from Hawaii (see below), in having smaller, slenderer proportions, and the anterior parapodial lobes are here acutely pointed, not rounded.

LUMBRINERIS MINUSCULA Moore

FIGURE 12, *e*, *f*

Lumbriconereis minuta TREADWELL, 1906, p. 1171 (U.S.N.M. No. 5215; off Hawaii).
Lumbrineris minuscula MOORE, 1911, p. 294.

A single fragment of 87 segments measures 20 mm. long. The head and some anterior segments (perhaps only a few), also the proboscideal armature, are missing. The first 16 segments on this piece are provided with limbate setae and composite hooks (fig. 12, *e*); in the next segments there are, in addition to superior and inferior limbate setae, two composite hooks (fig. 12, *f*) and one simple hook. More posteriorly only simple hooks and limbate setae are present. A posterior end of indeterminable length is missing, but the last segments present have a few (one or two) delicate limbate setae and several (3 or 4) hooded hooks. The maxillary apparatus (now missing) was illustrated by a figure that does not bring out the details; maxilla II was described with five teeth right and four left; the other maxillary plates are not distinguishable. The setae, originally thought to be of only two kinds, are actually of three kinds, composite hooks, simple hooks, and limbate setae. This error led Moore (1911, p. 294) to attribute some specimens from Catalina Island to this species (see below).

L. minuscula Moore (1911, p. 294) was proposed to replace *L. minuta* Treadwell (not Theél). In addition, a description was given for specimens from Catalina Island, which differ from the type of *L. minuscula* in several important respects and for which the new name *L. moorei* (see below) is proposed.

L. minuscula has affinities with *L. japonica* Marenzeller; both have composite setae in anterior segments. In *L. minuscula* limbate setae are present through at least 80 segments, in *L. japonica* they are absent after about 34 segments; in *L. minuscula* anterior parapodia have a broadly rounded, auricular postsetal lobe (fig. 12, *e*), in *L. japonica* this lobe is compressed, conical.

LUMBRINERIS MOOREI, new species

FIGURE 12, *a*, *b*, *g*

Lumbriconereis minuscula MOORE, 1911, p. 294 (in part) (U.S.N.M. No. 17403; off Catalina Island, in 1,350–2,182 fathoms).

There are two fragmentary specimens, differing greatly from the type of *L. minuscula* (see above) with which these were at first com-

pared. Moore (1911, pp. 294–295) has already given a lucid description, which agrees well with these individuals. The maxillary carriers are about as long as broad, with a lateral constriction at about the middle, the free ends are broadly rounded. Forceps are falcate; maxilla II has five left teeth, 4 right; maxilla III has one broad, blunt tooth on each side; maxilla IV has a single point on each side. The mandibles are now very thin, translucent (the calcareous parts probably dissolved away); the anterior end is flaring, the posterior ends slender, the two parts widely separated for more than one-third the total length.

The distribution of setae is as first described; figure 12, *a*, shows the greatly elongate limbate area of the pointed setae in anterior segments; hooded hooks are simple, with minutely denticulate distal end (fig. 12, *g*); in postmedian segments they are accompanied by very long, slender setae in the inferior part of the fascicle (fig. 12, *b*). The soft parts of parapodia are now too macerated for identification; the lobes were probably short.

These specimens were first believed (Moore, 1911) to represent perhaps the epitokous phase of *Lumbriconereis minuta* Treadwell (above), but since they differ also in other characters (hooks, maxillary parts) they are now thought to be different. There have been several species of *Lumbrineris* described from great depths, most of them characterized by the presence of long setae in a median region. This feature may be an adaptation to life at great depths or to a unique type of substratum. *L. punctata* McIntosh (1885, p. 252) from off New York, in 1,240 fathoms, blue mud, and *L. ehlersi* var. *tenuisetis* McIntosh (1885, p. 253) from between New York and Halifax in 1,340 fathoms, blue mud, are both said to have long, narrowly limbate setae in a region at about the thirtieth segment. *L. punctata* is different in that maxilla II has only two teeth on the left side and three (or four?) on the right; in *L. ehlersi* var. *tenuisetis* maxilla II has five teeth on each side and maxilla III has two teeth. *L. abyssorum* McIntosh (1885, p. 250) from off the western coast of South America, in 2,225 fathoms, blue mud, was described from very fragmentary materials in which the hooks had been lost; the longest setae, however, are much shorter than in *L. moorei*.

Two other species of *Lumbrineris* with long setae have been described from shallower depth—*L. neo-zealandiae* McIntosh (1885, p. 248) off New Zealand, in 700 fathoms, blue mud, and *L. kerguelensis* McIntosh (1885, p. 246) from off Kerguelen, in 110 fathoms, volcanic mud. The first was seemingly based on several species described as "varieties A, B, and D," of which only "variety A" supposedly has long setae; "varieties A and B" have dark acicula, "variety D" has yellow acicula. The second has composite setae in

an anterior region, hence different from the other species. It is difficult to make close comparison of these species with long setae because of the lack of information on several important points.

L. moorei is known only from off Catalina Island, in 1,350–2,182 fathoms, in gray mud and fine sand.

LUMBRINERIS PARVA-PEDATA (Treadwell)

FIGURE 10, *i*, *j*, *m*

Lumbriconereis parva-pedata TREADWELL, 1902, p. 198 (U.S.N.M. No. 16019; Ensenada Honda, Culebra).
Lumbrinereis elongata TREADWELL, 1931, p. 3 (U.S.N.M. No. 19622; Louisiana).

This species resembles a *Drilonereis* because of its long, slender, cylindrical form, and its proportionately tiny anterior parapodia. The proboscideal apparatus was not originally described. The maxillary carriers are comparatively massive, nearly as long as the forceps, broad at their place of attachment to the forceps, laterally constricted, and terminate distally in long, slender tips. The forceps taper to simple, falcate tips. Maxilla II has six teeth on each side, the distalmost tooth being shorter and somewhat recurved over the edge of the maxillary plate so that it is apt to be overlooked unless the plate is slightly turned; maxilla III has two blunt teeth on each side; maxilla IV has a single point on each side. Mandibles are white, calcareous, but now considerably eroded and soft; the two parts are long, nearly equaling the length of the entire maxillary apparatus; the base is incised for a short distance; the distal end is broad but not flaring.

No composite setae could be distinguished, but setae in the first few segments have been broken off flush with the body wall. In the original description simple hooks are shown in the second parapodium, accompanied by limbate setae. Anterior parapodia resemble those more posteriorly except that the latter are stouter. There is a triangular postsetal lobe (fig. 10, *i*). Hooded hooks (fig. 10, *m*) are distally finely denticulate.

This type has been compared with that of *L. elongata* Treadwell (1931, p. 3) from Louisiana, and the two are believed to be identical. Both are long, slender, greatly attenuate, with tiny parapodia in anterior segments, with simple hooded hooks present in anterior segments (fig. 10, *m*) already from the first. The proboscideal apparatus of *L. elongata* (now missing) was described as follows: "The forceps have a prominent carrier and a slender terminal portion. The left paired plate has a slender terminal tooth followed by three much heavier ones, and a basal hump that may be the remnant of a tooth [total 4]. The second paired plate [maxilla III] has two teeth, the terminal plate [maxilla IV] only one. The jaw was badly broken in removing and only the left side is intact, but so far as could be

determined the plates are symmetrical on the two sides." This differs, therefore, from *L. parva-pedata* only in that maxilla II has a different number of teeth, but as pointed out above the exact outlines are sometimes difficult to discern; also, the number of denticulations is not sharply distinctive. In other respects these two are so similar that separation is difficult.

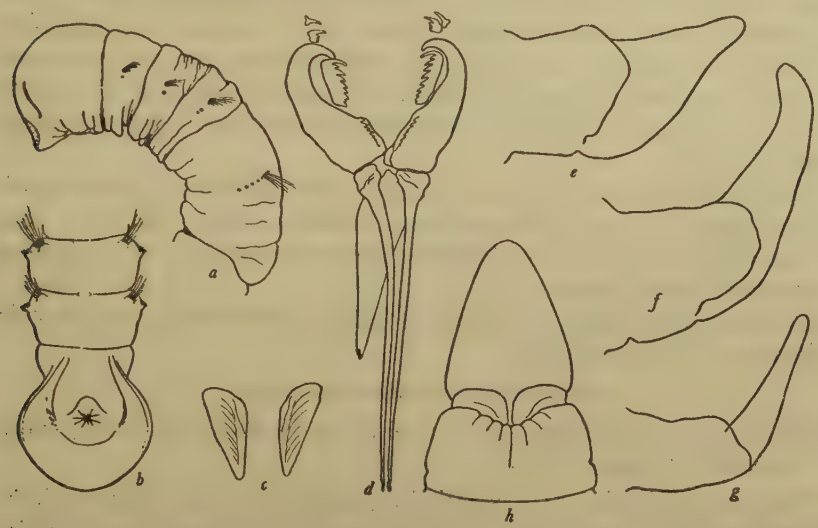

FIGURE 11.—Species of PETALOPROCTUS, DRILONEREIS, and LUMBRINERIS (enlarged)

a, b, Petaloproctus filifer (U.S.N.M. No. 5214): *a*, Outline of an anterior parapodium; *b*, posterior end in dorsal view.

c, d, Drilonereis robusta (U.S.N.M. No. 15813): *c*, Mandibles; *d*, maxillary carriers, unpaired piece and plates.

e–g, Lumbrineris erecta (cotype, No. 2585, Philadelphia Acad. Nat. Sci.): *e*, Tenth parapodium; *f*, a median parapodium; *g*, a posterior parapodium.

h, Lumbrineris maculata (U.S.N.M. No. 16018): Prostomial lobe in ventral view, showing specimen with elongate lobe.

Another related species is *L. robusta* Ehlers (1887, p. 104) from Florida, in 75 fathoms, and Habana, in 175 fathoms. It also has massive maxillary carriers and small maxillary plates; parapodial lobes are short throughout and have similar outlines. Maxilla II has five teeth. According to Ehlers, however, maxilla III has only one tooth, and the mandibles are separated at their bases for a greater distance. Most importantly, the body proportions are less attenuate, such that 182 segments measure 68 mm. long and 5 mm. wide.

LUMBRINERIS MACULATA (Treadwell)

FIGURES 11, *h*; 14, *d*, *e*

Lumbriconereis maculata TREADWELL, 1902, p. 198 (U.S.N.M. No. 16018; Puerto Rico).

The prostomial lobe is bluntly conical in one individual (about as long as broad), but considerably longer in another (fig. 11, *h*). Maxillary carriers are longer than wide and terminate basally in slender tips, more than shown (Treadwell, 1921, fig. 384); there is a lateral constriction on the proximal half. Forceps are falcate; maxilla II has four teeth on each side; maxilla III has two teeth on a side; maxilla IV has a long, slender, pointed piece on each side.

Parapodia from the first setiger have both limbate setae and simple hooded hooks, the postsetal lobe already long, triangular; a second parapodium is shown in figure 14, *d*. Posterior parapodia have slender, longer, postsetal lobes and are provided with only hooded hooks (fig. 14, *e*).

The specific name is preoccupied by M. Edwards (in Cuvier's Règne Animal) and by Quatrefages (1865, p. 365), but since both of these are believed to be *Arabella* species (Fauvel, 1923, p. 438), a new name is not applied.

L. maculata Treadwell is known only from Puerto Rico and Florida (Treadwell, 1921, p. 103).

LUMBRINERIS BILABIATA (Treadwell)

Lumbriconereis bilabiata TREADWELL, 1902, p. 199 (U.S.N.M. No. 16015; Mayaguez Harbor, Puerto Rico).

The only collection is a small fragment, 12.5 mm. long, with 59 setigers, caudally incomplete, all setae too badly damaged to identify. The prostomial lobe is depressed conical, longer than broad, without sulcus. Already in anterior segments the postsetal lobe is slender, digitiform, standing at an angle, directed more or less posteriorly, away from its base.

In the original description the proboscideal formula was not given. The forceps are falcate; maxilla II has five teeth on each side; maxillae III and IV have one tooth each.

LUMBRINERIS ERECTA (Moore)

FIGURE 11, *e–g*

Lumbriconereis erecta MOORE, 1904, p. 491 (San Diego, Calif.).

The types of this species are not deposited in the National collections; cotypes are contained in the Academy of Natural Sciences of Philadelphia (No. 2585). Through the kindness of Prof. J. Percy Moore, I was permitted to see them. There are three large, robust specimens, agreeing closely with many specimens collected by the author in the intertidal zones of southern California. The prostomium has a longitudinal groove ventrally, as originally stated, but this is weak in one individual. Figure 11, *e–g*, shows a tenth, a median and a posterior parapodium. Simple hooded hooks are present from the thirty-seventh segment, continued to the end.

Limbate setae are continued to the end, but absent from some parapodia. Perhaps this led Moore (1904, p. 491) to say that "by 50 [uncini] are alone present to the number of 4 or 5 which is further reduced to two or even one posteriorly * * * the slender setae do not altogether disappear until about LXXV." Actually, in these cotypes, as also in many specimens from southern California, some posterior parapodia continue to have limbate setae, to the posterior end.

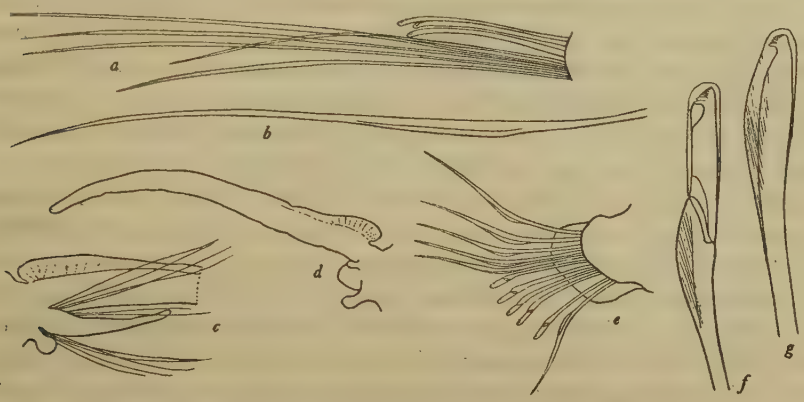

FIGURE 12.—Species of LUMBRINERIS and ARMANDIA (enlarged)

a, b, g, Lumbrineris moorei (U.S.N.M. No. 17403): *a*, A posteromedian parapodium with long setae; *b*, bilimbate seta from an anterior parapodium; *g*, a hooded hook from a posteromedian parapodium.

c, d, Armandia agilis (U.S.N.M. No. 4898): *c*, Seventh setiger in anterior view, the branchia cut off at the dotted line, with long, presetal, dorsal lobe and rounded, postsetal, ventral lobe; *d*, parapodium from posterior third of body, in posterior view.

e, f, Lumbrineris minuscula (U.S.N.M. No. 5215): *e*, An anterior parapodium, in anterior view, setae indicated; *f*, a composite seta from an anterior parapodium.

L. erecta is the commonest lumbrinerid with elongate, parapodial lobes, lacking hooded hooks anteriorly, in the intertidal of southern California. It occurs rarely as far north as Monterey. It has incorrectly been confused with *L. heteropoda* (see below).

LUMBRINERIS HETEROPODA (Marenzeller)

FIGURE 10, *e–g*

Lumbriconereis heteropoda MARENZELLER, 1879, p. 30 (Miya Bay, Japan).

The National collections contain specimens of what are believed to be this species, originating from Honshu Island, Japan. Since they differ notably from *L. erecta* Moore (see above), with which the latter has sometimes been identified (Crossland, 1924, p. 4), and also since Marenzeller's description seems to have been misinterpreted in some respects, the following remarks are added.

As Marenzeller's description was based on a specimen 120 mm. long, with 240 segments, it may have been almost, or quite, complete and mature. The prostomium was described as considerably pointed, large, longer than broad, as long as, or longer than, the first three segments. Parapodia differed in the various body region, as follows: "An den vorderen Rudern ist die Hinterlippe von vorne nach rückwärts zusammengedrückt, von oben gesehen schmal, am Ende etwas angeschwollen, die Vorderlippe kurz, fast gar nich vorspringend [fig. 10, *e*, based on specimen in U.S.N.M.] Allmälig wird die Hinterlippe dicker [in antero-posterior axis] aber etwas kürzer, und indem auch die Vorderlippe sich mehr entwickelt, wird die Differenz in der Länge zwischen beiden verringert; erstere überrage jedoch diese stats [fig. 10, *f*]. Die Übergänge bilden sich bis etwa zum 40. Ruder heraus; von hier ab bleibt diese Form bis weit nach hinten. Die Hinterlippe [fig. 10, *g*] zeigt sich von oben als ein relativ langer fingerförmiger, nach hinten gerichteter Fortsatz, der etwa die Hälfte der Länge, vom Ursprunge des Ruders bis zum Vorderrand der nur wenig vorspringenden Vorderlippe gemessen, ausmacht." This transition of parapodial lobes from anterior to posterior regions prompted the specific name *heteropoda*. Furthermore, the first 35 segments were said to be provided with only pointed setae, numbering first 13 in a parapodium, decreasing to 8 in the thirty-fifth. Hooded hooks were present from the thirty-sixth segment, accompanied with pointed setae, the latter continued in diminishing numbers to the end (at least through 200 segments).

Crossland (1924, p. 4) united *L. heteropoda* with *L. erecta* Moore (above) seemingly because of a misinterpretation of Marenzeller's description, based on collections from the Red Sea, Zanzibar, and Kenya Colony, but none from Japan or California. They are here believed to be distinct from each other, and perhaps each different from the Indo-Pacific specimens. Crossland concluded that Marenzeller did not see posterior segments in his specimen, yet Marenzeller states that he had a 240-segmented individual, and one that "gegen das Leibesende sich allmälig verjüngend." Crossland interpreted this as a regenerated specimen; it might be interpreted as one that was nearly complete, tapering posteriorly. Marenzeller stressed the marked difference in parapodial lobes of anterior, median and posterior segments, as described above.

In both *L. erecta* and *L. heteropoda* anterior parapodia lack hooded hooks, in the first through 40 to 44 segments, in the second through about 36 segments; both have pointed setae, though in diminishing number posteriorly throughout the body length; both have similar maxillary parts but the maxillary carriers are proportionately shorter and broader in *L. erecta* than in *L. heteropoda*. In *L. erecta*, middle

body segments have parapodia with prominent postsetal lobes which come to have the form of long, fingerlike processes, bending abruptly upward nearly at right angles, rising above the back.

One other species merits consideration in a discussion of this group, *L. sarsi* Kinberg (1865, p. 569) from Guayaquil, Ecuador. The type has greatly elongated posterior, postsetal lobes, but here the anteriormost parapodia, from the first, have some simple hooded hooks, accompanied by limbate setae.

LUMBRINERIS ZONATA (Johnson)

FIGURE 13, *a–c*

Lumbriconereis zonata JOHNSON, 1901, p. 408 (Puget Sound, Wash.).
Lumbrineris heteropoda MOORE, 1908, p. 346 (Kodiak Island, Alaska, in 35–41 fathoms) (not Marenzeller, 1879).
Lumbrineris sarsi HARTMAN, 1938, p. 12 (not Kinberg, 1865).

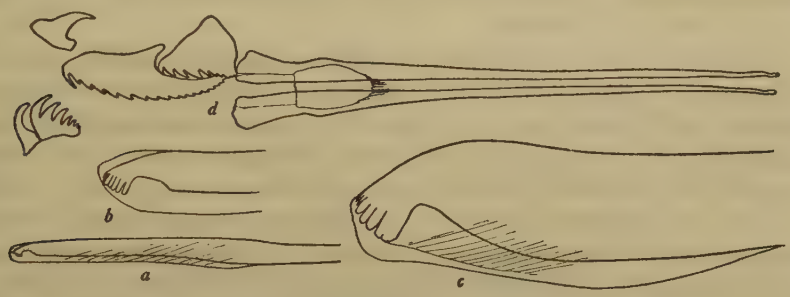

FIGURE 13.—Species of LUMBRINERIS and ARABELLA (enlarged)

a–c, *Lumbrineris zonata* (Kodiak Island, Alaska): *a*, Hooded hook from first setiger, showing long hooded region; *b*, distal end of same hook enlarged; *c*, one of five hooded hooks from a posterior parapodium, showing distal hooded region.
d, *Arabella iridescens* (U.S.N.M. No. 5216): Part of maxillary apparatus in dorsal view.

In the original description of this species, it is stated "setae * * * of two forms: winged capillary in anterior portion of the body and hooded crotchets in the posterior region," implying that hooded hooks are absent in anterior segments. I have again examined the type of *L. zonata* (at the Museum of Comparative Zoology) and verified the presence of simple hooded hooks in at least the second setiger (setae of the first are broken away near their base).

In many specimens examined, from Puget Sound south to southern California, the presence of simple slender hooded hooks (fig. 13 *a*, *b*) already from the first setiger, has been ascertained. After about the thirtieth or fortieth segments, these slenderer hooks are gradually replaced by heavier simple hooks (fig. 13, *c*) with shorter sheath. In most individuals limbate setae are entirely lacking in far posterior

segments, but occasionally a single, slender, limbate seta is present near the superiormost part of the fascicle. A twenty-first neuropodium contains 5 dark acicula, 10 inferior pointed setae, 6 simple hooded hooks, 10 superior pointed setae; its notopodium is provided with an embedded fascicle of acicula. A far posterior parapodium may contain three black acicula and about five hooded hooks, usually no limbate seta.

L. zonata is common in the intertidal zones of the northeast Pacific, to considerable depths. The National collections contain specimens from the Behm Canal, Alaska (Albatross stations), including depths of 14 to 256 fathoms.

Genus ARABELLA Grube

ARABELLA IRICOLOR (Montagu)

Nereis iricolor MONTAGU, 1804, p. 83.
Lumbriconereis tenuis VERRILL, 1873, p. 594 (part) (U.S.N.M. No. 13383; Vineyard Sound, in 12 fathoms).

A collection labeled "Cotypes" includes numerous small, slender individuals of *Arabella iricolor* (Montagu). The prostomium is subglobular, with four eye spots in a transverse row; parapodia are provided with only pointed, limbate setae, hence *Arabella*. The proboscideal armature is typical of *A. iricolor*.

In the original description the prostomium was said to lack eyes, also, at the sixteenth segment "recurved spatulate setae, with two to three hook-like denticles at the end [hooded hooks?], while two or three lanceolate ones remain." It seems, therefore, that these so-called "Cotypes" are not the same as that on which the first description was based. A holotype has not been found.

ARABELLA IRIDESCENS Treadwell

FIGURE 13, *d*

Arabella iridescens TREADWELL, 1906, p. 1171 (U.S.N.M. No. 5216; Pailolo Channel, between Molokai and Maui, in 12 fathoms).

There is only a single fragment, with much of the maxillary apparatus missing and most of the setae broken away flush with the body wall. The prostomium is elongate, depressed, triangular, without eye spots or other color markings; it lacks a median sulcus but has a depression in the middle on both dorsal and ventral sides. The proboscideal region has been largely dissected out; mandibles are lacking but some maxillary parts (fig. 13, *d*) remain. The carriers are very long, slender, with a short, rounded, ventral, unpaired piece that terminates in a ragged edge; the whole only slightly chitinized. Maxilla I on the right side is roughly triangular in outline, with 8 (or 9) teeth on the cutting edge. Maxillae II and III (fused) have 16 teeth; maxilla IV is presumably lost from this

specimen; maxilla V has a single tooth (fig. 13 *d*). On the left side only two plates (IV and V) remain. The formula, insofar as can be determined, appears to be : Right side=8 (or 9) +16+?+1; left side=?+?+7+1.

In posterior segments limbate setae are distally pointed, curved in the winged region; the superiormost and inferiormost are smooth, but three or four in the median part of the fascicle are denticulate, with several rows of spinelets in the thickest region.

A. iridescens is characterized in having a depressed, triangular prostomium without eye spots; maxilla I has numerous teeth on the cutting edge. Its proboscideal armature resembles that of *A. geniculata* Claparède (Fauvel, 1923, p. 439), but the latter has prostomial eyes.

ARABELLA ZONATA (Moore)

Notocirrus zonata Moore, 1903, p. 45 (U.S.N.M. No. 15736; off Honshu Island, Japan, in 34 fathoms).

There is only a single incomplete fragment that was dried when received; it lacks head and anterior end, including proboscideal parts. Parapodia are provided with only simple, pointed, limbate setae, such as characterize *Arabella*, but lack heavy acicular setae such as are present in *Drilonereis*. (See below.) It is therefore referred to the former.

Genus DRILONEREIS Claparède

DRILONEREIS ROBUSTA (Moore)

Figure 11, *c*, *d*

Laranda robusta Moore, 1903, p. 454 (U.S.N.M. No. 15813; off Japan, in 173–260 fathoms).

This species belongs to a small group of lumbrinerids in which (1) parapodia are provided with only simple, pointed limbate setae accompanied by single, heavy, projecting, acicular setae, (2) the prostomium lacks eye spots but has a conspicuous median, longitudinal sulcus on its dorsal surface, (3) the maxillary carriers are long, paired, slender pieces accompanied by a shorter, flat, unpaired piece on its ventral side, (4) forceps are long, strongly falcate, with denticulations at the base, and (5) mandibles consist of a pair of short, flat pieces about twice as long as wide. These characters are intermediate between two genera—*Arabella* Grube and *Drilonereis* Claparède—and differ from the first in lacking eye spots and having heavy projecting acicular setae and from the second in having well-developed maxillary parts in which the forceps are strongly falcate, with basal teeth; the other paired pieces are also denticulate (fig. 11, *d*). It agrees most nearly with *Drilonereis*.

Heavy acicular spines are first seen to project from the anteroventral part of the eighteenth setiger; they come to be heavier and

more conspicuous in median and posterior segments, where they are much thicker, though shorter, than the limbate setae.

The jaws were not described originally. They are as follows (proboscis dissected): The maxillary parts, including carriers, extend through setigers 3 to 13, the mandibles through setigers 1, 2, and part of 3. Carriers are long, slender, with an unpaired, ventral piece; forceps are thick, distally hooked, basally with six teeth; maxilla II has 10 teeth on each side, the distal tooth much the longest; maxilla III has a long tooth distally and four shorter teeth below; maxilla IV has a long tooth on each side (fig. 11, *d*). The formula is: I=6+1, II=10, III=5, IV=1. The ventrally located mandibles are dark, broad, flat, much shorter than the forceps (fig. 11, *c*).

Setae are smooth, narrowly limbate; a denticulate region was not observed in any examined. *D. robusta* is known only through its original discovery.

Family GLYCERIDAE

Genus GLYCERA Savigny

GLYCERA MEXICANA (Chamberlin)

FIGURE 9, *e*

Hemipodus mexicanus CHAMBERLIN, 1919, p. 349 (U.S.N.M. No. 19372; Gulf of California).

There is only an anterior fragment with proboscis retracted and the prostomium withdrawn into the anterior buccal cavity. The aileron of the jaw has a broad, spreading base and a long, produced fang (fig. 9, *e*). Setae include (1) superior, simple, and (2) inferior composite. In both of these respects it is a typical *Glycera* Savigny, to which it is hereby referred.

In anterior segments the presetal lobe is bifurcated; the postsetal lobe is short, entire. The presetal lobes are long and slender and resemble the equally long ventral cirri. Dorsal cirri are inserted far above the parapodial base.

There is little to distinguish this from *G. papillosa* Grube, from western South America. It bears resemblances also to *G. lancadivae* (Berkeley, 1939, p. 334) from Guatemala.

Family CIRRATULIDAE

Genus CIRRATULUS Lamarck

CIRRATULUS GRANDIS Verrill

Cirratulus grandis VERRILL, 1873, p. 606.
Cirratulus tenuis VERRILL, 1873, p. 607 (U.S.N.M. No. 15284; Vineyard Sound, Mass.).

The collection is labeled cotype. The prostomium is anteriorly rounded, slightly acute, without eye spots or other color marks.

Dorsal branchiae arise from the first setiger, but there is a pair of lateral tentacles inserted immediately in front. Branchial filaments (or their scars) number 10 to 12 on a side; their bases form an elongate, oval patch, the pair separated by a clear, median space equal to about half the width of one branchial base. Lateral tentacles arise from a point immediately above the notopodial base, but at the posterodorsal face of the notopodium.

Setae are pale yellow; the first 18 setigers have long, tapering capillaries; the dorsal setae somewhat exceed in length the ventral ones. From the nineteenth setiger a heavy spine is present ventrally in the neuropodium, accompanied with long, pointed setae. From the twenty-eighth setiger two such heavy spines are present, alternating with pointed setae; this arrangement continues through the rest of neuropodia. Notopodia have similar, heavy spines from the thirty-fifth setiger, in the inferior end of the fascicle, accompanied with pointed setae, continued so to the end. (Sometimes there are two heavy spines.)

In the original description (which was only preliminary) the setae were described as "long and slender in each ramus," but no mention was made of acicular spines.

C. tenuis Verrill agrees in all details with *C. grandis* Verrill, to which this is hereby referred.

Genus CIRRIFORMIA Hartman

CIRRIFORMIA FILIGERA (Chiaje)

Lumbricus filigerus Chiaje, 1828, p. 171.
Audouinia filigera Fauvel, 1927, p. 93.
Audouinea oculata Treadwell, 1932, p. 17 (U.S.N.M. No. 19640; Brazil).

In the type of *Audouinea oculata*, the prostomium lacks eye spots. The first setiger has a slender filament arising from the superior end of the setal fascicle. Between the fourth and fifth setigers the dorsal branchiae arise, those of one side nearly continuous with those of the other; no median space separates those of the two sides. From about the fifty-fifth setiger the lateral tentacles arise a short distance above the notopodium; more posteriorly they are inserted progressively more dorsally so that in postmedian segments the point of insertion is nearly midway between the notopodium and the middorsal line.

Acicular setae are first present in neuropodia from about the thirty-seventh setiger, and in notopodia from about the fifty-eighth setiger. In neuropodia there are three such acicular setae, only slightly falcate, alternating with long, capillary setae, this arrangement continued through a long region. In some far posterior neuropodia only acicular setae may be present, or the capillaries may

be much reduced. Notopodia have similar, but slenderer and longer, acicular setae, also alternating with capillary setae.

This agrees fully with *C. filigera* (Chiaje), to which it is hereby referred. It is well known from parts of South America (Ehlers, 1897, p. 110; 1901, p. 183; Fauvel, 1916, p. 446). It differs from *C. capillaris* Verrill (below) in that the latter has single acicular setae in neuropodia in posterior segments.

CIRRIFORMIA CAPILLARIS (Verrill)

Cirratulus capillaris Verrill, 1900, p. 653.
Cirratulus tenuis Webster, 1884, p. 323 (U.S.N.M. No. 4797; Bermuda) (not *C. tenuis* Verrill, 1873).

The single specimen of *C. tenuis* (U.S.N.M. No. 4797) is small, much contracted, with proportions as given by Webster. The prostomium is short, anteriorly rounded, without eyes. Dorsal branchiae arise, in a pair of crowded clusters, between the fourth and fifth setigers; the scars number 10 or more on a side and leave bare a short, median space. Lateral tentacles first arise from a point dorsal to the notopodial ridge, but in median and posterior segments the point of insertion moves progressively upward so that it comes to be nearly midway between the notopodium and the middorsal line. Notopodial and neuropodial setal structures have the same form and distribution as in *C. capillaris* Verrill, to which *C. tenuis* Webster is hereby referred.

Family OPHELIIDAE

Genus AMMOTRYPANE Rathke

AMMOTRYPANE AULOGASTER Rathke

Figure 14, *b*, *c*

Ammotrypane aulogaster Rathke, 1843, pp. 188–190, 205–208, pl. 10, figs. 1–3.—Fauvel, 1927, p. 133, fig. 47.
Ammotrypane fimbriata Verrill, 1873, p. 604 (U.S.N.M. No. 8076; off Gay Head, Mass., in 25 fathoms).

There are numerous specimens of *A. fimbriata*, labeled type (1), cotypes (2), and many others, all from various parts of New England, south to Long Island, in depths of 13 to 866 fathoms. Number of segments varies from 45 to 50. The body is slender, smooth. Branchiae are present from the second to the fifth last segment, number 40 or more pairs; they are simple, cirriform, extend distally far beyond the setal tips (fig. 14, *c*). Parapodia have a simple setigerous lobe and a longer, slenderer, ventral lobe. Setae are entirely simple, capillary. The anal end is provided with a long funnellike lobe, open ventrally, with a row of about seven pairs of filaments at the end, and a simple or slightly crenulate edge at its proximal end (fig. 14, *b*).

These specimens are not to be distinguished from *A. aulogaster* Rathke, already known from eastern North America (Webster and Benedict, 1887, p. 727).

Genus ARMANDIA Filippi

ARMANDIA AGILIS (Andrews)

FIGURE 12, *c*, *d*

Ophelina agilis ANDREWS, 1891, p. 289 (U.S.N.M. No. 4898; Beaufort, N. C.).

The collection includes three specimens; two are posteriorly incomplete. Interparapodial eye spots are present between segments 6/7, 8/9, * * * 16/17, 18/19, or 11 pairs; this is therefore a representative of *Armandia*. Setigers number 52. Branchiae are present from the second segment; they are long, cirriform, present on all other segments to the end; on their dorsal side, near the base, they have a thin, foliaceous flange (fig. 12, *d*).

On the first segment the upper presetal lobe (dorsal cirrus) is large and long, resembling a branchia except for its smaller size (it is about two-thirds as large); this gradually diminishes in size posteriorly so that in the posterior third of the body it is greatly reduced, papillar (fig. 12, *d*). The lower, postsetal lobe (ventral cirrus) is a minute, translucent, subglobular structure throughout (fig. 12, *c*, *d*). Setae are simple, flowing, capillary. The caudal funnel is long, compressed cylindrical, closed ventrally along a pair of longitudinal ridges, provided at its distal end with about 14 filiform cirri, and a much longer, thicker, ventral cirrus.

Armandia agilis differs from other species of the genus in its high setigerous count, in the structures of the presetal and postsetal lobes, and the closed anal funnel. It is known only from North Carolina.

ARMANDIA MACULATA (Webster)

FIGURE 14, *a*

Ophelina maculata WEBSTER, 1884, p. 322 (U.S.N.M. No. 4796; Bermuda).

The collection includes two specimens. There are 29 setigers [27 or 28 according to Webster]. Branchiae are present from the second, perhaps nearly to the end or at least to the third last segment; the posterior segments are now macerated, imperfect. The prostomium is thick, about as broad as long, but with a long, slender anterior cone nearly as long as the main part of the prostomium. Eyes cannot now be distinguished, but Webster (1884) described three, in a transverse series, near the posterior margin of the lobe.

Presetal and postsetal parapodial lobes are short, though broad, throughout, not unusual in any respect. A second has the proportions shown in figure 14, *a*. More posteriorly the postsetal lobes become

slenderer and a little longer but are never conspicuous; also, branchiae are longer but continue to be simple, cirriform. The pygidium is surrounded by about 20 papillae.

Webster described interparapodial eye spots, present from the seventh segment, numbering 11 pairs; hence this is an *Armandia*. These spots are not visible now. *A. maculata* is known only through its original discovery.

FIGURE 14.—Species of ARMANDIA, AMMOTRYPANE, and LUMBRINERIS (enlarged)

a, *Armandia maculata* (U.S.N.M. No. 4796): Second parapodium in posterior view.
b, *c*, *Ammotrypane aulogaster* (U.S.N.M. No. 8076): *b*, Anal funnel in left lateral view; *c*, seventeenth parapodium, in anterior view.
d, *e*, *Lumbrineris maculata* (U.S.N.M. No. 16018): *d*, Second parapodium, in anterior view; *e*, a posterior parapodium, in anterior view.

Genus OPHELIA Savigny

OPHELIA LIMACINA (Rathke)

Ammotrypane limacina RATHKE, 1843, pp. 190–192, 202–205, pl. 10, figs. 4–8.
Ophelia denticulata VERRILL, 1875, p. 39; 1882, pl. 9, fig. 3 (U.S.N.M. No. 16128; off Block Island, R. I., in 14 fathoms).
Ophelia limacina FAUVEL, 1927, p. 132, fig. 46.

The type of *O. denticulata* is labeled "Off Block Island, 14 fms. Aug. 18, 1874. P. M. 856 figs." Branchiae were described as denticulate; hence the specific name. Since, however, these denticulations are perhaps merely wrinkles of contraction, they are not significant. There are 9 anterior setigerous segments, lacking branchiae; this is followed by 18 branchial segments and 5 postbranchial segments, a total of 32 setigers. The anal ring is provided with 16–18 smaller papillae and 2 larger, lanceolate cirri ventrally.

This agrees fully with *O. limacina* (Rathke), already reported from eastern America by Webster and Benedict (1884, p. 724) and others.

Family MALDANIDAE

Genus PETALOPROCTUS Quatrefages

PETALOPROCTUS FILIFER (Verrill)

FIGURE 11, *a*, *b*

Maldane filifera VERRILL, 1880, p. 179 (U.S.N.M. No. 10486; Cape Cod Bay).
Lumbriclymene filifera VERRILL, 1900, p. 659.
Petaloproctus filifer ARWIDSSON, 1907, p. 114.

There is a single specimen, labeled "Type. *Mastigomaldane filifera* (Verr.). Cape Cod Bay. Aug. 30, 1879. Sta. 321. 29½ fms. *Speedwell.*" It is in several pieces, perhaps of an immature individual. No color remains. The anterior end lacks a cephalic plaque, is broadly rounded, turned ventrally (fig. 11, *a*). The first three segments are shorter than the fourth. There is a long, preanal, achaetous segment, with a well-rounded, simple anal plaque. The anal aperture is turned dorsally (fig. 11, *b*). Some median segments have long, hairlike setae, as typical of *Petaloproctus.*

Verrill (1900, p. 659) transferred this species to *Lumbriclymene*, with the statement that it "does not belong to *Petaloproctus* as St. Joseph supposed, but rather to *Lumbriclymene* Sars, but it differs from the type, so that the generic characters should be altered somewhat. Its anal region consists of a somewhat flattened cone, turned up dorsally and nearly acute, but without a limbus. The small anus is close to the tip on the dorsal side of the segment, while the oblique postero-ventral side may be flat or concave. The head has a central carina with a pit each side of it, but no definite plate or limbus. The anterior ventral tori contain one or two spiniform setae. The two short preanal segments have small tori, but no setae." This agrees reasonably well with the conditions in the type specimen, and is here referred to the genus *Petaloproctus.*

Arwidsson (1907, p. 114, 118) has referred this species questionably to his *P. tenuis borealis;* the similarities are indeed striking. The synonymy appears to be justifiable. Verrill's name has priority.

Genus PRAXILLURA Verrill

PRAXILLURA ORNATA Verrill

Praxillura ornata VERRILL, 1879, p. 179 (U.S.N.M. No. 11853; off Race Point, Cape Cod, Mass., in 25 fathoms).

The single type is in several pieces, or the pieces may represent more than one individual. If only one, there are well over 20 (or 25) segments. The head is that of a Lumbriclymenini, the lobe well rounded, smooth, turned down anteriorly so that the mouth is clearly ventral. Nuchal slits are shallow, crescentic. The material is unsatisfactory.

Genus RHODINE Malmgren

RHODINE BITORQUATA Moore

Rhodine bitorquata MOORE, 1923, p. 223 (U.S.N.M. No. 17248; Monterey Bay, Calif., in 204 fathoms).

This is known through only an anterior end. The prostomium lacks a plaque but has a long keel and conspicuous nuchal organs; they are inverted U-shaped, angular, the inner branch about half as long as the outer. The head is bent at an angle (nearly right) to the body, and set off on the dorsal side by a sharp, narrow, transverse ridge, about one-fourth of the distance from the first setiger to the anterior end. The first two segments are very long, back of their setigerous ridges. The posterior border of the first is provided with a great, entire collar, fitting more or less closely around the body. A similar collar from the anterior border of the third setiger extends forward around the posterior end of the second setiger, but this collar is less than half as high as the other, and longest on its ventral side; it is entire, with broad, shallow, dorsolateral clefts and a short, dorsal flap. Other segments are also long but lack collar.

R. bitorquata, known solely through its original record, is the only species of this genus known from the west coast of North America.

Family SABELLIDAE

Genus SABELLASTARTE Savigny

SABELLASTARTE INDICA (Savigny)

Sabella indica SAVIGNY, 1826, pp. 412–413.
Laonome punctata TREADWELL, 1906, p. 1179 (U.S.N.M. No. 5223; Hawaii).
Sabellastarte indica JOHANSSON, 1926, pp. 15–16, fig. 5.

The type collection of *Laonome punctata* includes four well-preserved specimens, the largest about 33 mm. long. They retain much pigment, especially on the wine-colored, tentacular bases and the transversely barred radioles. The dorsal side of the thorax, and to a lesser degree the ventral side including also the abdomen, are more or less heavily speckled with deep maroon spots, and a heavier, larger spot occurs regularly on the parapodial ridge between the notopodium and neuropodium.

Radioles lack eye spots or stylodes. The collar membrane consists of conspicuous rounded lappets, not sharply separated from the lateral lobes; the ventral lappets are longer, triangular, but continuous with the lateral lobes. The setal formula is:

$$\text{thorax}\ \frac{\text{notopodia with only bilimbate setae}}{\text{neuropodia with only avicular setae}}$$
abdomen with only limbate and avicular setae.

These specimens are typical representatives of a *Sabellastarte*, as shown by Johansson (1927, p. 157), and do not appear to be separable from the widely known *S. indica* Savigny (Okuda, 1937, p. 307, figs.).

Genus MEGALOMMA Johansson

MEGALOMMA CIRCUMSPECTUM (Moore)

Branchiomma circumspectum MOORE, 1923, p. 239 (U.S.N.M. No. 17021; off Santa Rosa Island, Calif., in 38–45 fathoms).

The collar membrane has high dorsal lappets, covering the peristomium; between its lobes and the lateral lobes there is a slight emargination and a deep cavity that extends down nearly through the first and second setigers, like a pocket; lateral lobes are slightly oblique and continued ventrally without incision, in a pair of long triangular flaps. Most radioles have small, more or less spherical, compound eyes at their tips.

M. circumspectum has been identified with *M. mushaensis* (Gravier) from the Red Sea (Monro, 1933, p. 1078), but I believe there are differences in the collars of the two that cannot be considered as mere variations of the same species. They are herein considered to be distinct.

Genus HYPSICOMUS Grube

HYPSICOMUS CIRCUMSPICIENS Ehlers

Hypsicomus circumspiciens EHLERS, 1887, p. 271.
Hypsicomus purpureus TREADWELL, 1924, p. 20 (U.S.N.M. No. 20325; Antigua).

The single type specimen of *H. purpureus* originates from the Pillars of Hercules, Antigua. The eye spots, originally described, are now faded out. Thoracic spatulate setae are broad, without (or with only a tiny) mucro. This specimen agrees well with the description of *H. circumspiciens* Ehlers, except that the tentacular crown is shorter in the first; however, it had been fixed outside the tube, permitting greater contraction.

H. circumspiciens is known from the West Indian region through other records, including *Sabella alba* Treadwell (1917, p. 266) and *Parasabella sulfurea* Treadwell (1917, p. 267). Johansson (1927, p. 139) has discussed the synonymy.

HYPSICOMUS species

Potamilla californica TREADWELL, 1906, p. 1178 (U.S.N.M. No. 5222; vicinity of Monterey Bay, Calif.).

The single type specimen bears the label "vicinity of Monterey Bay. Alb. Sta. 4551. 56–46 fms." The setal fascicle in the collar is an elongate series; it is an example of *Hypsicomus* Grube.

Another collection, labeled "*Potamilla californica*" (U.S.N.M. No. 17119) from Monterey Bay, Calif., *Albatross* station 4496, May 19, 1904, in 10 fathoms, contains a single, large specimen of *Demonax media* (Bush). Still another collection (U.S.N.M. No. 17120) from Monterey Bay, *Albatross* station 4463, May 13, 1904, in 111 fathoms, contains specimens of *Pseudopotamilla intermedia* Moore.

Genus POTAMETHUS Chamberlin

POTAMETHUS MUCRONATUS (Moore)

FIGURE 15, *a*, *h–j*

Notaulax mucronata MOORE, 1923, p. 243 (U.S.N.M. No. 17351; dredged off Santa Catalina Island, Calif., in 2,196 fathoms).

There are several specimens in a mass of loosely intertwined, soft, mud-covered, slender tubes. The tentacular filaments are greatly elongated but of uneven lengths, and free for their entire length; they appear loosely attached to the thorax. There are no eye spots, stylodes, or color markings. The peristomial region is unusually prolonged, and the collar membrane does not nearly cover it.

The setal formula of the thorax is:

notopodia with bilimbate setae and spatulate setae (fig. 15, *a*)	
neuropodia with long handled avicular (fig. 15, *h*, *j*) and pennoned setae (fig. 15, *i*)	

The pennoned setae are finer than the companion avicular setae, but the two have stems about equally long. They were seemingly overlooked in the original account since thoracic tori were said to have slender crotchets only. These fascicles are thus typical of the genus *Potamethus*.

Only a few species have been attributed to this genus: (1) *Potomethus spathiferus* (Ehlers) (1887, p. 278) originates from Florida, in 275 fathoms; (2) *Potamilla malmgreni* Hansen, from Norway, was referred to it by Bush (1904, p. 203); (3) *Potamethus scotiae* (Pixell) (1913, p. 356) comes from the Antarctic. Another species, *P. elongatus* (Treadwell) (see below) comes from Hawaii. The first, second, and last appear to be distinguishable as follows:

1. Collar membrane distinctly oblique 2
   Collar membrane straight except for ventral ends ..... mucronatus
2. Spatulate thoracic setae with a minute mucro ..... spathiferus
   Spatulate thoracic setae with a long, pointed mucro (fig. 15, *d*) ..... elongatus

POTAMETHUS ELONGATUS (Treadwell)

FIGURE 15, *b–d*

Potamilla elongata TREADWELL, 1906, p. 1178 (U.S.N.M. No. 5221; *Albatross* station 3883).

The type collection, labeled "Pailolu Channel, between Maiu and Molakai Islands, Albatross Sta. 3883, in 277 fms.," contains fragments of a single individual and portions of a dark, fragile, slender, silt-covered tube, very weakly chitinized. There is part of an anterior end with some radioles still attached. These are long, slender, without eyes or stylodes; they are free for their entire length. Their attachment to the thoracic region is weak. The peristomial region is long, a considerable portion not covered by the

collar membrane. The collar, though now broken, is deep both dorsally and ventrally, but strongly oblique (fixed in the tube).

The thoracic setal formula is as follows:

notopodia with bilimbate and spatulate (fig. 15, *d*) setae
neuropodia with long handled avicular (fig. 15, *c*) and pennoned (fig. 15, *b*) setae

The spatulate setae have a long, pointed mucro and are noticeably asymmetrical. Another unique feature is the long neck of the avicular setae (fig. 15, *c*) differing therein from the condition in *P. mucronatus* (fig. 15, *h*).

P. elongatus is known only through its original record.

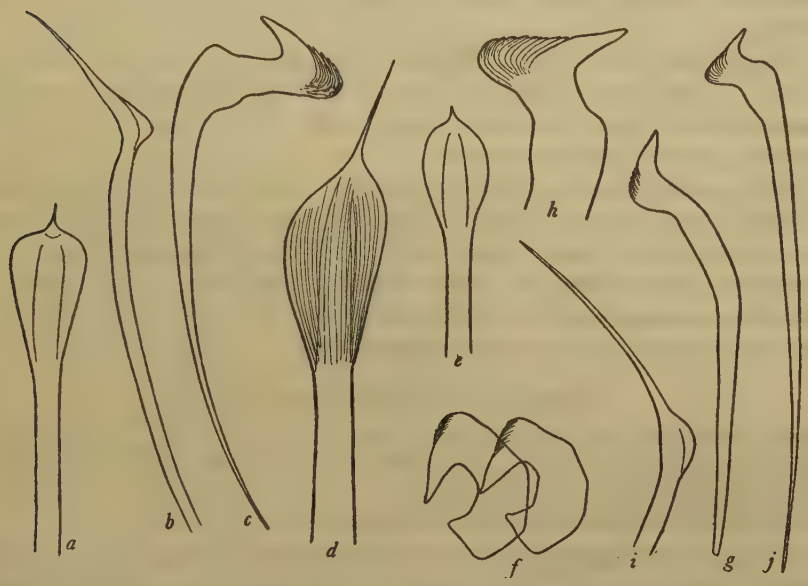

FIGURE 15.—Species of POTAMETHUS and CHONE (enlarged)

a, h–j Potamethus mucronatus (U.S.N.M. No. 17351): *a*, Spatulate seta; *h*, hooked end of thoracic uncinus; *i*, tip of pennoned seta; *j*, long-handled thoracic uncinus.

b–d, Potamethus elongatus (U.S.N.M. No. 5222): *b*, Pennoned seta; *c*, long-handled uncinus from same fascicle; *d*, spatulate thoracic seta.

e–g, Chone ecaudata (U.S.N.M. No. 17319): *e*, Spatulate, thoracic seta; *f*, abdominal uncinus from an anterior region; *g*, thoracic uncinus.

Genus CHONE Malmgren

CHONE ECAUDATA (Moore)

FIGURE 15, *e–g*

Jasminiera ecaudata MOORE, 1923, p. 246 (U.S.N.M. No. 17319; off Santa Cruz Island, Calif., in 38–45 fathoms).

Jasminiera ecaudata was originally described with "radioles free, without interbranchial membrane but provided on each side with a narrow, free margin of increasing width and passing into the distal

barbless tip which is flattened and coiled like a watch spring." One can still clearly distinguish just this condition on many of the radioles, but I believe the "free" condition of these radioles is due to breakage. Some of the radioles are still united by a palmate membrane, extending well over half the length of the radioles; beyond the united part, it is continued distally, the full length of the radioles, ribbonlike; the distal ends are barbless.

The thorax consists of eight setigers. It is provided with long handled uncini (fig. 15, *g*), and spatulate setae (fig. 15, *e*) in addition to superior pointed limbate. The abdomen is provided with narrowly limbate setae ventrally, and avicular uncini (fig. 15, *f*) dorsally.

The thoracic collar is fairly high, straight, the peristomium concealed. There is a middorsal notch; ventrally the collar is entire except for a slight V-shaped notch. Laterally there is a weak undulation, but the collar is entire.

This species was originally referred to *Jasminiera* because the radioles were thought to lack a palmate membrane; since, however, this is believed to have been present, it is transferred to *Chone*. *C. ecaudata* differs from *C. mollis* (Bush), also from California, in that the spatulate setae of the latter are without mucro and the abdominal uncini have a much longer beak.

CHONE INFUNDIBULIFORMIS Krøyer

Chone infundibuliformis Krøyer, 1856, p. 33.
Sabella picta Verrill, 1885a, p. 440; 1885b, pl. 42, fig. 188 (U.S.N.M. No. 8706; off Newport, R. I., in 20 fathoms).
Chone infundibuliformis Fauvel, 1927, p. 334.

The type of *Sabella picta* is labeled "Off Newport, 20 fms. Fish Hawk. Sta. no. 784." It is typical *Chone* Malmgren, with entire straight collar, that is rather high, slightly flaring, with a notch dorsally. The thorax includes eight setigers, provided dorsally with bilimbate setae, and spatulate setae and ventrally with long handled hooks. Abdominal uncini are avicular.

This has been compared with specimens of *C. infundibuliformis* from western Europe and is believed to be identical.

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